

ART 34 AMDT

Claims

1. A monitoring system for monitoring a fluid at a site, comprising:

5 at least one sensor for monitoring the fluid and providing data indicative of a characteristic of the fluid;

10 a processor associated with the site for receiving the data from the sensor and for storing the data in a storage, the processor being programmed with predetermined rules and being for applying the predetermined rules to determine if the data, and therefore the characteristic of the fluid, meets a predetermined criterion, and being for determining whether the data needs to be transmitted to a 15 centralised control station;

20 a communication device for establishing a data transmission link between the processor and the centralised control station and for transmitting the data over the link so the data can be transmitted in bulk when the rules determine the data needs to be transmitted to the station;

25 a server and a data store at the centralised control station for receiving and storing the data for utilisation by a user over the Internet; and

an event indicator for providing an indication if the predetermined criterion is not met so remedial action can be taken.

30 2. The system of claim 1, wherein the event indicator comprises an alarm at the site which is activated under control of the processor if the predetermined criterion is not met.

35 3. The system of claim 1 or claim 2, wherein the processor is also for, in the event of determining that the characteristic of the fluid does not meet a predetermined criterion, transmitting data via the link to

ART 34 AMDT

- 21 -

the centralised control station, and the event indicator also comprising a communication processor at the centralised control station for transmitting a message to an authorised person that the predetermined criterion has 5 not been met.

4. The system of claim 2, wherein the event indicator comprises an audible or visual alarm which is activated to indicate that the characteristic falls outside the 10 predetermined criterion.

5. The system of claim 3 wherein the message comprises a mobile telephone message forwarded to a mobile telephone of the person or an SMS message forwarded to the mobile 15 telephone, or an e-mail message.

6. The system of claim 1 wherein the communication link comprises a mobile telephone data communication link.

20 7. The system of claim 1 wherein a plurality of sensors are provided for monitoring the fluid and providing a plurality of signals indicative of different characteristics of the fluid.

25 8. The system of claim 1 wherein the fluid comprises waste water in a trade-industrial waste water plant, water within a cooling system of an air conditioning plant, or air within a refrigeration system.

30 9. The system of claim 1 wherein the programmed rules provide that data is transmitted in bulk when the storage is 80% full.

35 10. A method of monitoring a fluid at a site, comprising the steps of:
monitoring the fluid with at least one sensor to provide data indicative of a characteristic of the fluid;

12 March 2004

ART 34 AMDT

- 22 -

storing the data and processing the data at the site in accordance with predetermined rules to determine if the data, and therefore the characteristic of the fluid, meets a predetermined criterion, and for determining whether the data needs to be transmitted to a centralised control station;

establishing a data transmission link between the processor and the centralised control station and transmitting the data over the link so the data is transmitted in bulk when the rules determine the data needs to be transmitted to the station;

receiving the transmitted data with a server and a data store at the centralised control station so the data can be utilised by a user via the Internet; and

providing an event indication if the predetermined criterion is not met so remedial action can be taken.

11. The method of claim 10, wherein providing the event indication comprises generating an alarm at the site which is activated under control of the processor if the predetermined criterion is not met.

12. The method of claim 10 or claim 11, wherein in the event of determining that the predetermined criterion is not met, data is transmitted via the transmission link to the centralised control station, and the step of providing an event indication comprises transmitting from the centralised control system a message to an authorised person that the predetermined criterion has not been met, and further including the step of transmitting data via the link to the centralised control station in the event that the predetermined criterion is not met so the event indication is immediately transmitted to the person.

13. The method of claim 12, wherein the message comprises a mobile telephone message forwarded to a mobile telephone

ART 34 AMDT

of the person or an SMS message forwarded to the mobile telephone, or an e-mail message.

14. The method of claim 10 wherein the communication link
5 comprises a mobile telephone data communication link.

15. The method of claim 10 wherein the fluid is monitored
by a plurality of sensors for providing a plurality of
signals indicative of different characteristics of the
10 fluid.

16. The method of claim 10 wherein the fluid comprises
waste water in a trade-industrial waste water plant, water
within a cooling system of an air conditioning plant, or
15 air within a refrigeration system.

17. The method of claim 10 wherein the program rules
provide that data is transmitted in bulk when a storage
containing the data is 80% full.
20

18. A monitoring system for a trade/industrial waste
water plant which has a collection tank for collecting
waste water, a mixing tank for receiving the waste water
from the collection tank and in which the pH of the waste
25 water is adjusted, a settling tank for receiving the waste
water from the mixing tank, the settling tank having a
pump for pumping the waste water from the settling tank to
drain, the system comprising:

a sensor for measuring the pH level of the waste
30 water in the mixing tank or the settling tank, and for
providing data indicative of the pH level;

a processor at the plant for receiving the data from
the sensor and for storing the data in a storage, the
processor being programmed with predetermined rules and
35 being for applying the predetermined rules to determine if
the data, and therefore the pH level, meets a
predetermined criterion, and being for determining whether

ART 34 AMDT

the data needs to be transmitted to a centralised control station;

5 a communication device for establishing a data transmission link between the processor and the centralised control station and for transmitting the data over the link so the data can be transmitted in bulk when the rules determine the data needs to be transmitted to the station;

10 a server and data store at the centralised control station for receiving and storing the data so the data can be utilised by a user via the Internet; and

15 an event indicator for providing an indication if the pH level does not meet the predetermined criterion so remedial action can be taken.

15

19. The system of claim 18 further comprising:

a sensor for measuring the water level in the settling tank and for providing data indicative of the water level;

20

a sensor for sensing flow from the pump and for providing data indicative of flow from the pump; and

25

wherein the processor receives the data from all the sensors to determine if the pH level, water level and flow meet predetermined criteria so that data relating to all the sensors is able to be transmitted to the centralised control station by the transmission link for receipt by the server and data store, and so the event indicator can provide an indication if the predetermined criterion relating to any one of the sensors is not met so remedial action can be taken.

30

20. The system of claim 19 wherein the plant further comprises:

35 a reservoir for providing an acid solution to the mixing tank;

a reservoir for providing an alkaline solution to the mixing tank; and

ART 34 AMDT

- 25 -

the system further comprises:

respective sensors for measuring the level of the solutions in the acid reservoir and alkaline reservoir and providing signals indicative of the levels;

5 the processor being for receiving the signals to determine whether the level of the acid solution and alkaline solution meets predetermined criteria; and

10 the event indicator providing an indication if the predetermined criteria are not met so that the reservoirs can be refilled if necessary.

21. The system of claim 18 wherein a first sensor is provided for measuring the pH level in the mixing tank, and a second sensor is provided for measuring the pH level 15 in the settling tank, each for providing respective data indicative of pH level for receipt by the processor.

22. The system of claim 19 wherein the processor controls the pump so as to activate the pump to pump waste water 20 from the settling tank when the water level in the settling tank reaches a predetermined level.

23. The system of claim 20 wherein the system also includes a temperature sensor for measuring the 25 temperature of the waste water in the settling tank.

24. The system of claim 20 wherein the processor controls application of acid solution or alkaline solution to the mixing tank depending on the pH level of the water.

30

25. The system of claim 20 wherein the rules implemented by the processor include one or more of the rules selected from the following group: the temperature of the waste water, the pH level of the waste water, whether the pump 35 is operating, the flow rate of waste water discharge by the pump, whether the central controller has made contact with the remote monitoring processor via the communication

link within a specified time period, and whether the remote monitoring processor is ready to download data to the central control station.

5 26. The system of claim 25 wherein the event indicator provides an indication of the need to turn on or off the pump, replenish the acid solution or alkaline solution in the acid reservoir and alkaline reservoir, instigate a local alarm, transmit a message to the authorised person, 10 and download data from the remote monitoring processor to the central controller.

15 27. The system of claim 18 wherein data is transmitted in bulk when the storage is 80% full.

28. A method of monitoring a trade/industrial waste water plant which has a collection tank for collecting waste water, a mixing tank for receiving the waste water from the collection tank and in which the pH of the waste water 20 is adjusted, a settling tank for receiving the waste water from the mixing tank, the settling tank having a pump for pumping the waste water from the settling tank to drain, the method comprising the steps of:

25 measuring the pH level of the waste water in the mixing tank or the settling tank with a sensor, and providing data indicative of the pH level;

30 storing the data and processing the data at the plant in accordance with predetermined rules to determine if the data, and therefore the pH level, meets a predetermined criterion, and for determining whether the data needs to be transmitted to a centralised control station;

35 establishing a data transmission link between the processor and the centralised control station and transmitting the data over the link in bulk when the rules determine the data needs to be transmitted to the station;

ART 34 AMDT

- 27 -

receiving the transmitted data with a server and data store at the centralised control station so the data can be utilised by a user via the Internet; and

5 providing an event indication if the pH level does not meet the predetermined criterion so remedial action can be taken.

29. The method of claim 28 further comprising:

10 measuring the water level in the settling tank and for providing data indicative of the water level;

sensing flow from the pump and for providing data indicative of flow from the pump; and

15 processing the data from all the sensors to determine if the pH level, water level and flow meet predetermined criteria so that data relating to all the sensors is able to be transmitted to the centralised control station by the transmission link for receipt by the server and data store, and so the event indication is provided if the predetermined criterion relating to any one of the sensors 20 is not met so remedial action can be taken.

30. The method of claim 29 wherein the plant further comprises:

25 a reservoir for providing an acid solution to the mixing tank;

a reservoir for providing an alkaline solution to the mixing tank; and

the method further comprises:

30 measuring the level of the solutions in the acid reservoir and alkaline reservoir and providing data indicative of the levels;

processing the data to determine whether the level of the acid solution and alkaline solution meets predetermined criteria; and

35 providing the event indication if the predetermined criteria are not met so that the reservoirs can be refilled if necessary.

31. The method of claim 29 wherein the pump is activated to pump waste water from the settling tank when the water level in the settling tank reaches a predetermined level.

5

32. The method of claim 30 further comprising measuring the temperature of the waste water in the settling tank.

10 33. The method of claim 30 further comprising controlling application of acid solution or alkaline solution to the mixing tank depending on the pH level of the water.

15 34. The method of claim 30 wherein the rules implemented by the processor include one or more of the rules selected from the following group: the temperature of the waste water, the pH level of the waste water, whether the pump is operating, the flow rate of waste water discharge by the pump, whether the central controller has made contact with the remote monitoring processor via the communication 20 link within a specified time period, and whether the remote monitoring processor is ready to download data to the central control station.

25 35. The system of claim 34 wherein the event indicator provides an indication of the need to turn on or off the pump, replenish the acid solution or alkaline solution in the acid reservoir and alkaline reservoir, instigate a local alarm, transmit a message to the authorised person, and download data from the remote monitoring processor to 30 the central controller.

36. A monitoring system for cooling towers of an air conditioning system, the monitoring system comprising:
35 a sensor for sensing the pH level of water in the cooling tower, and providing data indicative of the pH level;

ART 34 AMDT

- 29 -

a sensor for measuring the temperature of the water in the cooling tower, and providing data indicative of the temperature;

5 a sensor for measuring the conductivity of the water in the cooling tower, and providing data indicative of the conductivity;

10 a processor associated with towers for receiving the data from the sensors, storing the data in a storage, and for applying predetermined rules to determine whether the pH level, temperature and conductivity fall within prescribed limits, and for determining whether the data needs to be forwarded to a centralised control station;

15 a communication device for establishing a data transmission link between the processor and the centralised control station and for transmitting the data over the link so the data can be transmitted in bulk when the rules determine the data needs to be transmitted to the station;

20 a server and a data store at the centralised control station for receiving and storing the data for utilisation by a user via the Internet; and

25 an event indicator for providing an indication if the prescribed limits are not met so remedial action can be taken.

37.

The system of claim 36 wherein the data is transmitted in bulk when the storage is 80% full.

38. A method of monitoring cooling towers of an air 30 conditioning system, the method comprising:

sensing the pH level of water in the cooling tower, and providing data indicative of the pH level;

measuring the temperature of the water in the cooling tower, and providing data indicative of the temperature;

35 measuring the conductivity of the water in the cooling tower, and providing data indicative of the conductivity;

ART 34 AMDT

- 30 -

storing and processing the data at the cooling towers in accordance with predetermined rules to determine whether the pH level, temperature and conductivity fall within prescribed limits, and for determining whether the 5 data needs to be forwarded to a centralised control station;

establishing a data transmission link between the processor and the centralised control station and transmitting the data over the link so the data can be 10 transmitted in bulk when the rules determine the data needs to be transmitted to the station;

receiving the transmitted data by a server and a data store at the centralised control station for utilisation by a user via the Internet; and

15 providing an indication event if the prescribed limits are not met so remedial action can be taken.

39. The method of claim 38 wherein the data is transmitted in bulk when the storage containing the data 20 is 80% full.

40. A monitoring system for monitoring a refrigeration unit, the monitoring system comprising:

a sensor for sensing air temperature within the unit 25 and providing data indicative of the air temperature;

a processor at the unit for receiving the data from the sensor and for storing the data, the processor being programmed with predetermined rules and being for applying the predetermined rules to determine if the data, and therefore the air temperature, meets a predetermined 30 criterion, and being for determining whether the data needs to be transmitted to a centralised control station;

a communication device for establishing a data transmission link between the processor and the 35 centralised control station and for transmitting the data over the link so the data is transmitted in bulk when the

ART 34 AMDT

- 31 -

rules determine the data needs to be transmitted to the station;

5 a server and a data store at the centralised control station for receiving and storing the data so the data can be utilised by a user via the Internet; and

an event indicator for providing an indication if the criteria is not met so remedial action can be taken.

10 41. The monitoring system of claim 40 wherein the data is transmitted in bulk when the storage is 80% full.

42. A method of monitoring a refrigeration unit, the method comprising:

15 sensing air temperature within the unit and providing data indicative of the air temperature;

20 storing and processing at the unit the data in accordance with predetermined rules to determine if the data, and therefore the air temperature, meets a predetermined criterion, and for determining whether the data needs to be transmitted to a centralised control station;

25 establishing a data transmission link between the processor and the centralised control station and transmitting the data over the link so the data is transmitted in bulk when the rules determine the data needs to be transmitted to the station;

30 receiving the transmitted data by a server and a data store at the centralised control station for so the data can be utilised by a user via the Internet; and

providing an event indication if the criteria is not met so remedial action can be taken.

43. The method according to claim 42 wherein the data is transmitted in bulk when the storage containing the data is 80% full.